

Linkage of Biofuel to Price of Food and Oil

S. Pramanik

Research Scholar

Chandradeep Solar Research Institute, Kolkata, India

M. C. Chattopadhyay

Research Guide

Chandradeep Solar Research Institute, Kolkata, India

Abstract

Global biofuel production has been increasing really fast over the last few years, but the recent expanding biofuel industry has raised substantial concerns which need immediate attention. World agricultural markets have featured unusual price peaks and volatility in the last few years. It has been debated that the previously unseen price movements in food prices are related to price of crude oil, where biofuel production is suspected to have created a new link between crude oil and food prices. Rise in oil price would reduce global food supply through direct impacts as well as through diversion of food commodities and cropland toward the production of biofuels. The aim of this paper is to perform systematic analysis of the linkage of biofuel to price of food and oil price.

Keywords: Biofuel, Oil price, Food price

I. INTRODUCTION

Mankind today faces several challenges related to hunger and poverty, environmental problems, and scarcity of energy. Escobar et al. 2009 correlated 3 challenges as three furia of mankind” (Escobar et al. 2009). Numerous measures and policies have been implemented to address these problems. One that has obvious relations to all three furia is the promotion and extended use of biofuels. The new growths on global food commodity markets are attributed to different sources. Abbott et al. (2008) has explained and mentioned a mix of causal factors that activated the first food price spike in 2008. Low harvests due to poor weather conditions, the exchange rate of currency fluctuation, high oil prices and increment of biofuel use. The concept that biofuels have created a novel link between oil and food products and that oil price peaks are co-related into food commodity markets is supported by literature search. The question whether and if yes, how the prices of food commodities and oil are closely related and what part of biofuels interfere with this link has been one of the most debated topics in energy and agricultural economics during the few last years (Zilberman et al., 2013).

II. METHOD

My research paper is to focus on Linkage of biofuel to price of food and oil; the methodology of the study is based on two namely;

- In depth literature review
- To critically analyse the Linkage of biofuel to price of food and oil.

The methodology undertaken for this research can be summarized in the following points:

A. Data Capture:

- 1) *I performed an initial search procedure in scientific databases:*

Springer, World Scientific, PubMed and Science Direct, Google scholar, British Library, and Navigant research

- 2) *The search criteria were based on key words:*

biofuels, biomass, fossil fuels, bioethanol, bio diesel, food price and oil price.

B. Sampling:

In approximately 30 articles were read and selected that had the most relevant and appropriate to the subject, and I choose a total of approximately 8articles which is relevant for my paper write up and that can be found in the references section.

C. Information Analysis:

- 1) *The information collected, were carefully analyzed, following two main variables:*

- Variable 1: Linkage of biofuel to price of food and oil.
- Variable 2: Food price and its impact globally.

D. Results:

Based on the descriptive research and the variables used to analyse the information (research articles), provides the results of research that are the basis for the discussion and conclusions.

III. RESULT AND DISCUSSION

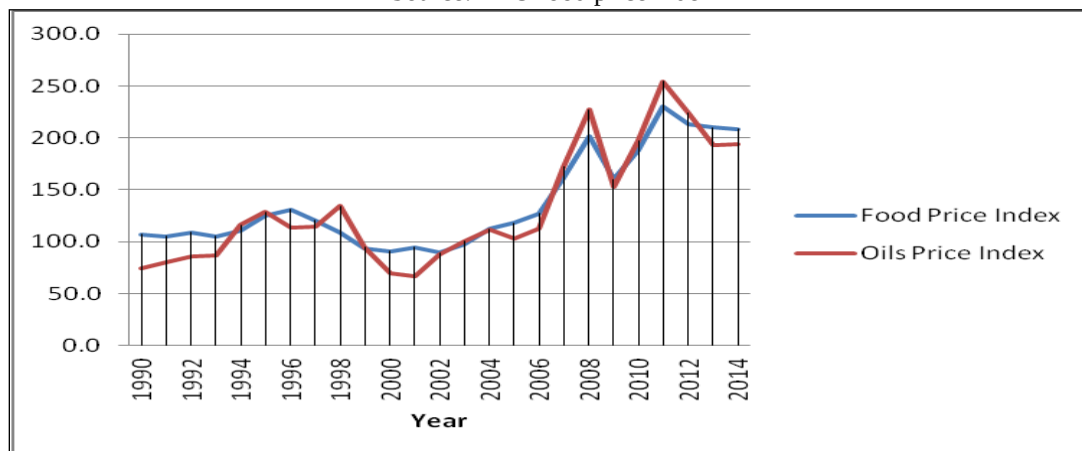
The advancement of biofuels in the last decade has led to the aggravation of problems currently faced by developing nations. If a large global demand for first-generation biofuels ensues, vast stretches of arable land could be converted from the production of foodstuffs to the cultivation of cash crops, to be sold to countries for production of biofuel. Apart from reducing the availability of food at a regional or national level in these largely agrarian-based economies, this would lead to an increase in the price of such food that still manages to find its way to market. One of the factors driving demand for ethanol has been rising oil prices. A large number of economic studies and literature research have analysed relationships between oil prices and crop prices. As many studies have observed, there have been times since 2007 when high oil prices made the ethanol production from maize crop competitive with gasoline, largely due to added tax subsidies (Abbott et.al , 2008).

In these case, it is quite logical for ethanol producers to keep running business to keep up with the demand and keep purchasing corn until its price rises to a “break-even point”. In a competitive market, and when the production of ethanol is dominant enough to divert a considerable share of the grain market, which was the case since 2007, corn prices adjust to the “break-even point”.

Table - 1
Relationship between Oil Prices and Food Commodity Prices

ANNUAL FOOD PRICE INDICES		
Date	Food Price Index	Oils Price Index
1990	107.2	74.2
1991	105.0	79.9
1992	109.2	86.2
1993	105.5	87.1
1994	110.3	116.2
1995	125.3	128.7
1996	131.1	113.7
1997	120.3	114.6
1998	108.6	134.2
1999	93.2	94.7
2000	91.1	69.5
2001	94.6	67.2
2002	89.6	87.4
2003	97.7	100.6
2004	112.7	111.9
2005	118.0	102.7
2006	127.2	112.7
2007	161.4	172.0
2008	201.4	227.1
2009	160.3	152.8
2010	188.0	197.4
2011	229.9	254.5
2012	213.3	223.9
2013	209.8	193.0
2014	208.5	193.6

Source: FAO food price index



Source: FAO food price index

Fig. 1: Relationship of food and oil prices from 1990 to 2014

According to the analyses by Abbott, Hurt and Tyner (2008), the break-even conditions prevailed during much of 2007 and 2008, and oil prices were capable of driving the price of corn from USD6.00 to USD7.00 a bushel. The crop price trend can be judged by oil prices only if capacities are not restricting biofuel production in response to oil prices. As Mallory, Irwin and Hayes (2012) and Abbott (2012) argue, these conditions continued thereafter (even when ethanol demand was hitting the blend wall), due to exports. Only during periods where biofuel plant capacity are limited, or with other unexpected developments (such as the 2012 drought that led food and feed users to push corn prices even above their fuel energy value) the price of corn would deviate from its break-even price with ethanol. This connection between oil prices and corn does not apply to other crops as directly. Biodiesel prices do not appear to be economically competitive even with high oil prices, and ethanol production in Brazil varies driven by many other factors other than only the price of oil. Yet, because of the association between corn prices and other crop prices, the pressure of high oil prices on corn translates into higher prices of other crops.

To be very practical, no one is accusing the huge price increases only on biofuels. Hunger and malnutrition were widespread before the biofuels boom ever occurred. According to the UN World Food Programme, 854 million people were undernourished from 2001–2003, and approximately about 10 million people die of hunger or hunger-related diseases in an average every year. However, it must be admitted that the demand for biofuel feedstock is putting a pressure on food supply system that was already overextended by rising demand. This point should also be considered, the demand for biofuel affects even nonfeedstock crops, as farmers plant feedstock instead of food on their land. The price of rice hit a record in April 2008, according to Forbes.com Market Watch, which again showed that “the World Bank estimated that 33 countries faced ‘social unrest’ because of soaring food and energy prices.” in the meantime, biofuel production is rapidly rising around the world. Brazil, the United States, and Europe account for the majority of share of today’s biofuel production and consumption (Tenenbaum, 2008). Other researchers feel that there are a tighter link between ethanol and food prices. For example, Runge and fellow University of Minnesota economics professor Benjamin Senauer wrote in the May/June 2007 issue of *Foreign Affairs*, “The enormous volume of corn required by the U.S. ethanol industry is sending shock waves through the food system. By putting pressure on global supplies of edible crops, the flow in ethanol production will translate into higher prices for both processed and staple foods around the world.” Now that world is experiencing a new age of conversion of food crops into fuels, a new chapter must be considered—the link between the price of food and the price of petroleum. As petroleum fuels get more expensive, biofuels become more lucrative, therefore, biofuel producers can afford to pay more for their feedstock. According to Lester Brown, an analyst of global resources who founded the World Watch Institute and now head the Earth Policy Institute; this new relationship puts hungry people in direct competition with empty gas tanks. “Historically the food and energy economies have been largely separate, but now with the construction of so many fuel ethanol distilleries, they are merging,” he says. “If the food value of grain is less than its fuel value, the market will move the grain into the energy economy. Thus, as the price of oil rises, the price of grain follows it upward.” (Tenenbaum, 2008).

To be very honest, fundamental causes of rising food prices are many and it is a very complex issue. They include factors such as adverse weather conditions that affect crop productivity, speculative or precautionary demand for food commodities, and inappropriate policy responses such as export bans of foods. More important are structural factors that include rising energy costs, stagnation in crop productivity, inadequate policies or failures that restrain agricultural development, climate change, rising demand for higher value and grain-intensive foods, and diversion of crops or croplands to biofuel production. Among these factors, biofuels have all the blame, largely due to the media’s argument of the ‘food vs. fuel’ debate (Bakhat et.al, 2008).

IV. CONCLUSION

The increase in oil price has resulted in worries about wealth and sustainability of economic systems, mostly in developing countries where the energy consumption is high compared to fossil resource. The use of crop for biofuel production has increased in the last few years. This is to protect the country from these global oil price spikes and reduce their foreign energy dependence. In parallel to these developments the global markets of food commodities also experiences a major food price increase and risen price volatility like in energy markets. This brought up a whole new topic and suspicions that the increased use of food commodities for biofuel production has led to food price increases. This in turn provokes hunger and starvation in the developing countries where it is a problem to satisfy their basic nutritious needs at rising world food prices. This provoked food vs. fuel debate and initiated a large number of research projects on the relationship and causal effects between crude oil and food prices (Bastiani et.al, 2013).

Bulk of research that has been carried out on the price links of food commodities and crude oil in the last few years. But now with recent biofuel production rise, present researchers focus their finding and result for different categories of food and agricultural products and their price relationships with crude oil. This is important since a potential correlating price relationship of food commodities and crude oil is theoretically possible even without any biofuel production, because crude oil is an important production factor for food and agricultural products. Hence, finding a relationship for crude oil and food commodities does not necessarily mean that biofuel plays any role in this relationship. Therefore, it is necessary to investigate the price relationship of different food and agricultural products, distinguishing between those food products that are used for biofuel production and those that are not.

Reviewing all the literature work, I could conclude that there are some indications of biofuel production providing an additional link between food and oil prices, but the indication is not entirely coherent and clear. More research, particularly

following link between food and oil price, to analyse price links with crude oil for different food products, is necessary to draw a clear-cut conclusions.

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